WHAT IS CLAIMED IS:

1. A solid-state image pick-up device having a plurality of photoelectric converting devices arranged like a tetragonal grid in a row direction and a column direction orthogonal thereto over a surface of a semiconductor substrate, comprising:

a plurality of vertical transfer sections provided corresponding to a plurality of photoelectric converting device strings having the photoelectric converting devices arranged in the column direction respectively and serving to transfer a charge of the photoelectric converting device in the column direction;

a horizontal transfer section for transferring the charge from the vertical transfer section in the row direction; and

an output section for outputting a signal corresponding to the charge to be transferred by the horizontal transfer section,

wherein the vertical transfer section includes a vertical transfer channel and a plurality of vertical transfer electrodes provided on an upper layer of the vertical transfer channel,

the vertical transfer channel is provided in winding shape between the photoelectric converting devices constituting the corresponding photoelectric converting device string,

the vertical transfer electrode includes a first vertical transfer electrode having a first conductive layer formed on the upper layer of the vertical transfer channel between the photoelectric converting devices and a second vertical transfer electrode having a second conductive layer formed on the upper layer of the vertical transfer channel on a side of the photoelectric converting device, and

the first vertical transfer electrode and the second vertical transfer electrode corresponding to the photoelectric converting devices for the same row are driven in response to driving signals having the same phase,

respectively.

2. The solid-state image pick-up device according to claim 1, wherein the vertical transfer channel is formed with the same arrangement and shape for the photoelectric converting device strings.

3. The solid-state image pick-up device according to claim 1 or 2, wherein a charge reading region for reading the charge of the photoelectric converting device onto the vertical transfer channel is formed in contact with the vertical transfer channel on the side of the photoelectric converting device.

4. The solid-state image pick-up device according to claim 1 or 2, wherein a charge reading region for reading the charge of the photoelectric converting device onto the vertical transfer channel is formed in contact with the vertical transfer channel between the photoelectric converting devices.

5. The solid-state image pick-up device according to claim 4, wherein a position of the charge reading region with respect to the photoelectric converting device is identical for each of the photoelectric converting device strings and the positions of the photoelectric converting device strings which are adjacent to each other are different from each other.

6. The solid-state image pick-up device according to claim 5, wherein two kinds of collecting microlenses having different collection ratios are provided corresponding to each of the photoelectric converting devices, and

the two kinds of microlenses are provided like a checker, respectively.

7. A solid-state image pick-up device having a plurality of photoelectric converting devices arranged like a tetragonal grid in a row direction and a column direction orthogonal thereto over a surface of a semiconductor substrate, comprising:

a plurality of vertical transfer sections provided corresponding to a plurality of photoelectric converting device strings having the photoelectric converting devices arranged in the column direction respectively and serving to transfer a charge of the photoelectric converting device in the column direction;

a horizontal transfer section for transferring the charge from the vertical transfer section in the row direction; and

an output section for outputting a signal corresponding to the charge to be transferred by the horizontal transfer section,

wherein the vertical transfer section includes a vertical transfer channel and a plurality of vertical transfer electrodes provided on an upper layer of the vertical transfer channel,

the vertical transfer channel includes a first portion provided on a side of each of the photoelectric converting devices constituting the corresponding photoelectric converting device string and a second portion provided between the photoelectric converting devices and wholly has a shape of a comb,

the vertical transfer electrode includes a first vertical transfer electrode having a first conductive layer formed on the upper layer of the vertical transfer channel between the photoelectric converting devices and a second vertical transfer electrode having a second conductive layer formed on the upper layer of the vertical transfer channel on a side of the photoelectric converting device, and

the first vertical transfer electrode and the second vertical transfer electrode corresponding to the photoelectric converting devices for the same row are driven in response to driving signals having the same phase, respectively.

8. The solid-state image pick-up device according to claim 7, wherein a downstream end of the transfer channel provided below the first vertical transfer electrode is formed to be almost coincident with an end of the first portion having a small channel width which is positioned on a downstream thereof.

9. The solid-state image pick-up device according to claim 1 or 7, wherein a light receiving region of the photoelectric converting device has such a shape that an aspect ratio is approximately 1.